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(54) Abstract Title
Merchandise security tag with data storage

(57) A tagging system for use in a retail outlet includes transponders with integral memories. The transponders are attached to merchandise within the outlet and each contains a memory device which may be written to and remotely read. The memory device stores such things as an identification code, price, size, promotional information and item specification. An enquiry point is located within the retail unit for customers to view the stored data before taking merchandise to the till. The till simultaneously reads the information from a plurality of merchandise transponders and uses the information to automatically price the goods and stock take. Once the items have been run through the till, the transponder is not removed. Instead the purchaser's name and address, obtained either by keyboard or by swiping a magnetic-strip loyalty card, is written to the transponder, following which the goods may subsequently pass through the exit without triggering an alarm. Also mentioned is the implementation of a readable transponder within an item of clothing or footwear for timing races.

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DESCRIPTION

SYSTEM FOR USE IN RETAIL OUTLET

The present invention relates to a system for tagging of items in a retail outlet of the general type which includes a number of remotely detectable tags which are associated with items for sale, and means for remotely detecting the tags.

Known systems utilising remotely detectable tags attachable to items for sale in a shop are intended to improve security. A known tag for use in such a system is formed in two halves securely joinable via a narrow connector which can for example be pushed through a buttonhole of a garment to secure the tag thereto. The tag is such that special release means, provided at the point of sale, are required to release it.

Exits from a retail premises fitted with the system are provided with detectors for detecting the tags, the outputs of the detectors being used to selectively activate an alarm to indicate when a tag passes through an exit, thereby providing a warning of possible shop lifting.

In such known systems, the tags are all alike and the only information obtainable from the system is the fact that a tag has passed through an exit.

General purpose electronic tags are now known which take the form of transponders. Such tags can comprise integrated circuitry

giving the tag a memory (which can be formed as eg. an EEPROM and be non-volatile - ie. not corrupted by loss of power) and the ability to be read and written to using, typically, amplitude modulated radio frequency electromagnetic fields. Such tags can function without an internal power source, using current induced by the field to drive the circuitry.

Such tags can be protected against unwanted writing by use of a "challenge and response" algorithm using encrypted messages.

An aim of the present invention is to improve the efficiency and/or attractiveness to customers and/or security of a retail outlet.

In accordance with a first aspect of the present invention there is provided a tagging system for use in a retail outlet, the system being adapted for use with a plurality of transponders which are provided with memories, adapted to be written to and remotely read, and are incorporated in or adapted for connection to an item for sale, the system comprising reading means for remotely reading the memory of a transponder and means for providing information relating to the item for sale by reference to the content of the memory of the transponder.

In such a system, each transponder can be associated with an individual item for sale, and product information relating to the item can be accessed by reading the transponder. Such information may for example be provided to a control computer and/or may be output in a human comprehensible form.

Since the transponder is writable, the system can further comprise writing means for writing to a transponder memory. This is preferably done remotely (ie. without an electrical connection being made to the transponder). A transponder can thus be provided with specific information, which may be relevant to the item to which the transponder is attached, or may be for other purposes. For example, a promotional scheme could be implemented by writing to selected transponders a code distinguishing them from the others, and a purchaser choosing an item bearing one of the selected transponders could be given a reward - eg. a cash prize.

Preferably, the system comprises display means for displaying the information relating to the item for sale.

Still more preferably, the display means and the reader are incorporated in or connected to a customer enquiry unit, such that the memory of the transponder of an item placed on, in or adjacent to the customer enquiry point can be read and the information relating to the item displayed.

The display may for example be by means of an LCD or cathode ray screen.

In such a system, a user can simply offer an item bearing the transponder up to the reader (or place it therein or thereon) to obtain information relevant to the item.

Such information may include:

the item's price;

the item's size;

availability of related items (eg. other colours/sizes etc.);

promotional information;

the item's specification (eg. materials of manufacture).

By adapting the reading means to be placed or mounted in a publicly accessible area of a retail outlet and used by customers, the customer is enabled to find out about a product by offering same up to the enquiry point. The enquiry point can serve as a promotional tool and can relieve shop assistants of the need to answer certain customer enquiries.

The present invention can also aid automation of point of sale activities. At present, bar codes are commonly applied to items for sale. At the point of sale (normally at the cash tills) a bar code reader is provided which is linked to a database. The bar code is used to access product information, including product name and price, on the database, and receipt data including a list of items purchased and the amount payable are compiled as the shop assistant presents each bar code individually to the reader in the correct orientation. This individual presentation of each item is a time consuming operation, contributing to checkout queues etc.

A more rapid mode of operation at the point of sale is made possible by the present invention. A point of sale device may be

provided, as part of the system according to the invention, which comprises means for remotely reading the memory of a transponder and means for processing the sale of an item by reference to the information thereby obtained.

Thus, for example, the arrangement may be such that each item need only be moved past or through the means for reading in order to record its sale.

To further speed the process, the reading means at the point of sale device are preferably adapted to read the memories of a plurality of transponders concurrently, and thereby to process a plurality of sales.

Such a point of sale device may be suitable for detecting and reading the transponders attached to all the items in a trolley or basket, thereby allowing sale of all of the items to be processed concurrently, even without their removal from the trolley/basket.

It is particularly preferred that the point of said device is adapted to write to a transponder memory information indicating that an item has been sold. The device may even be adapted to write to the transponder memory information identifying an individual such as the purchaser of an item.

One advantage of the ability to record the sale of an item on its transponder is that it is possible to implement a particularly advantageous anti-theft system, comprising detector means adapted to

detect a transponder positioned in a selected zone and to supply a warning signal (eg. an electrical signal which controls an alarm) if the memory of the transponder does not contain information indicative of the sale of the item.

By mounting the detector means at an exit, one can detect items whose sale has not been recorded as they are removed from the shop, and give a corresponding warning that shop lifting may be in progress.

The transponders may be fixedly attached to, or incorporated in, the items being sold.

It is not necessary to remove the transponders upon purchase, since the anti-theft system can be arranged not to be activated by the transponders attached to items whose sale has been recorded.

The system may use information obtained by reading the transponders to aid stock control.

In accordance with a particularly preferred aspect of the present invention, the system further comprises a computer implemented database adapted to store stock information which is accessible and/or amendable by reference to information obtained from the memory of a transponder.

Preferably, the sale of an item can be recorded and the stock information in the database amended by reference to information

obtained by reading the memory of a transponder. This can allow the database to be constantly and automatically updated as each sale is made. it may be achieved by communication of the point of sale device with the database.

In accordance with a preferred embodiment of the present invention, the memories of some or all of the transponders contain identifying codes, which may be write protectable. These codes may be used by the database to identify the item as it is sold, and also to access product information stored in the database.

It is particularly preferred that the system according to the present invention comprises means for writing to a transponder memory information relating to the item for sale. The ability to write (and preferably then to re-write) information to the transponder is advantageous in increasing the flexibility of the system.

In accordance with an especially preferred embodiment of the present invention, the system comprises signalling means for detecting a transponder positioned in a selected zone and selectively providing a visual display and/or an audible signal in response to the presence of the transponder.

The audible/visual signal is preferably suitable for attracting a person's attention. Still more preferably, the audible/visual signal may incorporate information obtained by reading the transponder.

Such a system may for example allow a signal to be given to a person entering a shop carrying a transponder (eg. on or in previously purchased footwear or clothing) and the signal may even incorporate information relating to the item in question or to the individual concerned. The visual signal may for example be presented through a screen (eg. an LCD or cathode ray screen) or may be presented using a projection system.

The signalling means may comprise a voice synthesizer so that text information obtained by reading the transponder memory can be audibly spoken.

In accordance with a second aspect of the present invention, there is provided an item of footwear or clothing provided with a transponder which is provided with a memory and is adapted to be written to and remotely read.

Such an item can be used in a system as set out above, leading to the advantages described.

It is particularly preferred that the item is a shoe. (The word "shoe" as used herein should be understood to encompass boots, training shoes and slippers). In this case, the transponder is most preferably disposed in the sole of the shoe. In this way, the transponder may if necessary be retained securely in the shoe. Alternatively, in accordance with the present invention, the transponder may be disposed in or attached to the upper of the shoe.

The incorporation of a transponder in clothing makes possible subsequent identification of an individual wearing the clothing e.g. for promotional purposes.

In accordance with a third aspect of the present invention, there is provided a finish gate for use in timing a race, provided with means for remotely detecting and timing entry of a transponder having a memory into a finish zone and for reading the memory of the transponder and thereby providing information for identifying a contestant associated with the transponder.

The finish gate may be incorporated in a system for timing a race further comprising at least one transponder which is adapted to be remotely written to and read.

The transponder may have any of the features disclosed above, and in particular may be incorporated in or attached to a shoe, preferably a training shoe.

In accordance with a fourth aspect of the present invention, there is a transponder which is provided with a memory, is adapted to be remotely written to and read, and is incorporated in or adapted for connection to an item for sale, the memory containing information relating to the item for sale.

Preferably, the information relating to the item for sale stored in the memory comprises one or more of the following:-

a code identifying the item;

the item's price;

the item's size;

availability of related items;

promotional information;

the item's specification.

Still more preferably, the transponder is non-removable from the item for sale.

A specific system embodying the present invention will now be described, by way of example only.

The system comprises numerous transponders, each having an internal memory (formed in this embodiment by an EEPROM, which is non-volatile). The transponders can each be remotely written to and read using electromagnetic fields. In the exemplary system, the transponders are readable using an amplitude modulated radio frequency field, and readers forming part of the system each comprise an antenna or other known means for creating the field.

The system is for installation in a shop, and in use each item of the shop's stock on display is provided with a respective transponder. Items of clothing have transponders contained in hemmed pockets, while items of footwear such as training shoes have transponders disposed in their sole or secured to or in their uppers. Other items have transponders removably attached thereto.

Neither the items on display nor the shop shelves bear price

markings. Instead, a customer enquiry point incorporating a screen and a transponder reader is provided. To find out the price or the details of an item, the customer presents the items to the enquiry point, whereupon the relevant information is displayed on the screen. The enquiry point has a touch screen or keyboard to take input from the customer, and in response to such input may provide selected additional information, eg. on related items such as sizes or colours of the same model in stock.

When the purchaser takes the item to the point of sale to make a purchase, a reader/writer connected to the point of sale device (eg. the cash till) reads the transponder to identify the item and process the sale, and writes to the transpónder a code indicating that the item has been sold. The transponder is not removed from the item. In addition, the purchaser's name and address are input to the point of sale device, eg. via a keyboard or by use of a machine readable card such as a loyalty card having a magnetisable strip, and written to the transponder.

At the exits from the shop, a reader antenna is provided to interrogate the transponders passing through the exit and cause an alarm to sound if any do not bear the code indicating sale of their associated item.

At the shop entrance, there is provided a reader for interrogating any transponders brought into the shop (eg. transponders

carried in/on clothing previously purchased) the reader's output being connected to electronics controlling a display screen and a voice synthesizer. When a person bearing a transponder enters the shop, his/her name (previously written to the transponder memory) is read and a welcome message incorporating the name is spoken by the voice synthesizer, while a display containing the name is shown on the screen.

The provision of transponders in/on items of clothing/footwear is exploited in a system for timing a race, in which a finish gate adapted to detect the transponders and thereby to identify a contestant and provide timing information. Thus for example, a particular manufacturer might arrange for such a gate to be provided at the end of a fun run or marathon, and to detect transponders in/on its training shoes, so that timing information could be provided for each contestant wearing such shoes.

CLAIMS

1. A tagging system for use in a retail outlet, the system being adapted for use with a plurality of transponders which are provided with memories, adapted to be written to and remotely read, and are incorporated in or adapted for connection to an item for sale, the system comprising reading means for remotely reading the memory of a transponder and means for providing information relating to the item for sale by reference to the content of the memory of the transponder.

2. A system as claimed in claim 1, further comprising writing means for writing to the memory of a transponder.

3. A system as claimed in claim 1 or claim 2, comprising display means for displaying the information relating to the item for sale.

4. A system claimed in claim 3, wherein the reading means and the display means are incorporated in or connected to a customer enquiry unit.

5. A system as claimed in claim 4, wherein the customer enquiry has means for receiving commands from a user.

6. A system as claimed in any preceding claims, comprising a point of sale device comprising means for remotely reading the memory of a transponder and means for processing the sale of an item by reference to the information thereby obtained.

7. A system as claimed in claim 6, wherein the reading means of the point of sale device is adapted to read the memories of a

plurality of transponders concurrently presented thereto and the point of sale device is adapted thereby to process a plurality of sales.

8. A system as claimed in any preceding claim, comprising a point of sale device adapted to write to a transponder memory information indicating that an item has been sold.

9. A system as claimed in claim 8, further comprising anti-theft means comprising detector means adapted to detect a transponder positioned in a selected zone and to supply a warning signal if the memory of the transponder does not contain information indicative of sale of its associated item.

10. A system as claimed in claim 9, wherein the detector means are adapted to be mounted at, adjacent or around an exit from premises and to detect a transponder passing through the exit.

11. A system as claimed in any of claims 8 to 10, wherein the point of sale device is adapted to receive and to write to a transponder memory information relating to a person such as the purchaser or intended recipient of an item.

12. A system as claimed in any preceding claim, further comprising a computer implemented database adapted to store stock information which is accessible and/or amendable by reference to information obtained by reading the memory of a transponder.

13. A system as claimed in claim 12, which is arranged such that in use the sale of an item can be recorded and the stock

information in the database appropriately amended by reference to information read from the memory of a transponder.

14. A system as claimed in any preceding claim, wherein the memories of at least some of the transponders contain identifying codes.

15. A system as claimed in claim 14, wherein a portion of the transponder memory, containing the identifying code, is write protectable.

16. A system as claimed in any preceding claim, wherein means are provided for writing to a transponder memory information relating to an item for sale.

17. A system as claimed in any preceding claim, comprising signalling means for detecting a transponder positioned in a selected zone and selectively providing a visual signal and/or an audible signal in response to the presence of the transponder.

18. A system as claimed in claim 17, wherein the signalling means are adapted to read the transponder memory and to provide the visual signal and/or the audible signal selectively in dependence on the information thus obtained.

19. A system as claimed in claim 17 or claim 18, wherein the signalling means are adapted to read the transponder memory and to incorporate information thereby obtained in the visual signal and/or the audible signal.

20. A system as claimed in any preceding claim, comprising a transponder which is disposed in the sole or upper of a shoe.

21. An item of footwear or clothing provided with a transponder which is provided with a memory and is adapted to be written to and remotely read.

22. A transponder which is provided with a memory, is adapted to be written to and remotely read, and is incorporated in or adapted for connection to an item for sale, the memory containing information relating to the item for sale.

23. A transponder as claimed in claim 23, wherein the information relating to the item for sale stored in the memory comprises one or more of the following:-

a code identifying the item;

the item's price;

the item's size;

availability of related items;

promotional information;

the item's specification.

24. An item as claimed in claim 22 or claim 23, wherein the transponder is non-removable from the item.

25. A finish gate for use in timing a race, provided with means for remotely detecting and timing entry of a transponder having a

memory into a finish zone and for reading the memory of the transponder and thereby providing information for identifying a contestant associated with the transponder.

26. A system for timing a race further comprising at least one transponder which is adapted to be remotely written to and read.

27. A system for timing a race as claimed in claim 26, wherein the at least one transponder is disposed in or attached to an item of clothing or footwear.

28. A system for timing a race as claimed in claim 27, wherein the transponder is disposed in the sole or upper of a shoe.

29. A system for tagging of items in a retail outlet substantially as herein described.

The Patent Office

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Application No: GB 9719595.2 **Examiner:** Jared Stokes
Claims searched: 1-20, 22-24 **Date of search:** 7 January 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): H4L (LACX, LAX)

Int Cl (Ed.6): G06K (7/08, 7/10)
G08B (13/24)

Other: On-Line - WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	EP 0 724 241 A2	(Kipp) See abstract, whole document	7
Y	EP 0 692 774 A1	(Paxar) See abstract	20,21,24
X	WO 93/17404 A1	(SLS) See page 3 lines 9-34	1-3,6, 8-10, 12-14,16, 22,23
X,Y	US 5 151 684	(Johnsen) See column 2 line 59-column 3 line 59	X: 1-3,6, 8-10, 12-14,16, 22,23 Y: 7,20, 21,24
X	JP 9 062 934 A	(Nippon) See WPI abstract accession No. 97-217669/199720	1 and 22 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.